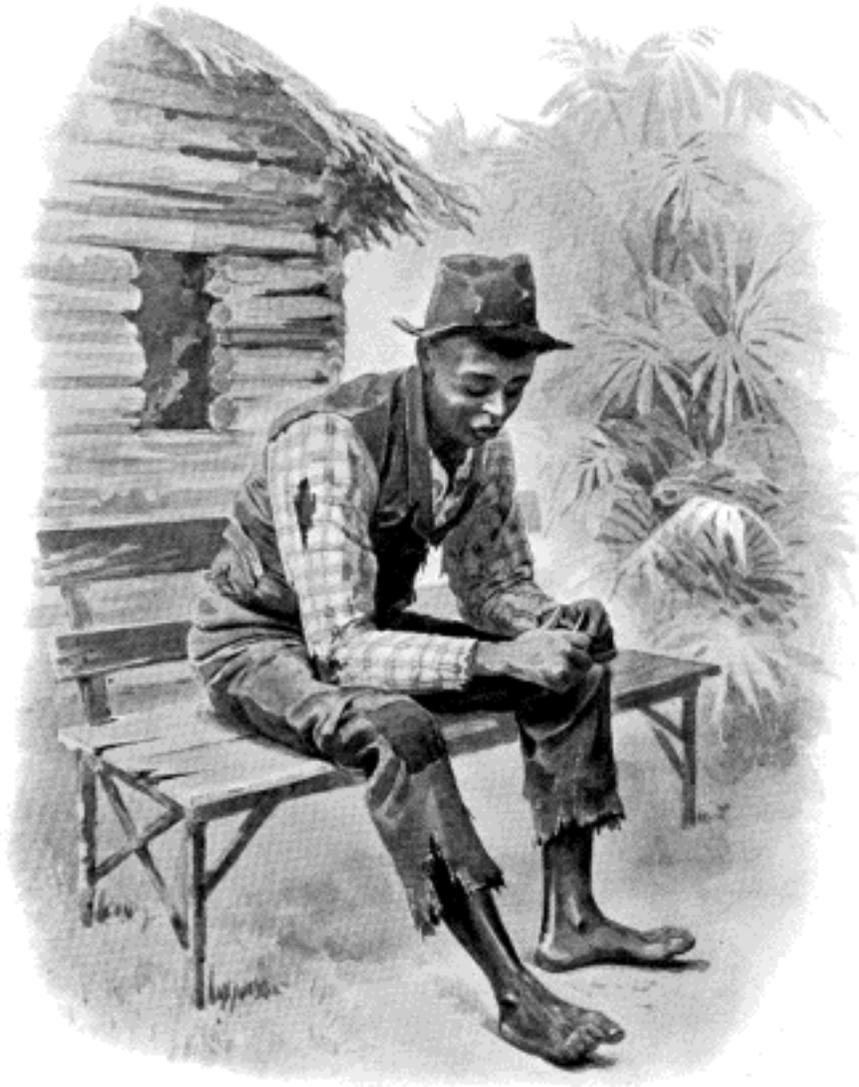


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Botanical Medicine Monographs and Sundry



A GINGER PEELER.

IN THE LAND OF GINGER—JAMAICA.

By F. B. KILMER.

The books state that "*Zingiber officinale*, Roscoe (*Amomum zingiber*), is a native of Asia, and that it has been introduced into most tropical countries, and is now found in

the West Indies, South America, tropical western Africa, and Queensland in Australia.” But the vial handed over the drugstore counter, even though it may contain a weak decoction of pepper, will invariably be labeled “Jamaica Ginger.” In these notes we shall, therefore, study this plant as seen in its popular habitat, thus keeping in sympathy with the West India planter, to whom the only known spot where ginger grows is in his sunlit garden.

In the track of the ocean steamers sailing from New York or Liverpool toward the southern continent, as they pass from the cold grey waters of the Atlantic into the warm blue waters of the Caribbean Sea, at a point in the windward passage 100 miles west of San Domingo, 50 miles south of Cuba, lies Jamaica. Donnelly created his island of “Atlantis” in these waters. Assuming his story to be true, St. Jago, the gem of the Antilles—Ginger Land—is a favorable location for his Eden. By a vivid imagination we might, from the present inhabitants, trace a lineage back through Ham, and arrive at a picture of Adam planting ginger in the first garden. As the traveler approaches Ginger Land he is impressed with the magnificence and beauty he sees outlined against a perfect sky, terrace upon terrace of mountains upon mountains spring into view, dark purple mountains) rent by fissures, jutting into the blue heavens. The shores are covered with lively green down to the water's edge; here and there a white spot, completely embowered in foliage, marks the plantations and settlements. Columbus formed a relief map of this island for his queen by crumpling a piece of paper in his hand. The landscape of Ginger Land is truly crumpled but picturesque, and the ginger plant grows luxuriantly on the steep sides of its crumpled elevations, from 2000 feet up to the lofty summits of the blue mountain range. In gorges, in romantic glens, sinks, cockpits, valleys, through the ages there has been deposited a rich, humus soil, this is drained by innumerable streams, along the banks of which, among everblooming tropic flowers, ginger finds a congenial habitat.

One of the essential requirements for the growth of this plant is sunshine—Old Sol is here young, bright and active.

Another requisite for growth—moisture—is also here in plenty. In some portions, 281 inches, or 23 feet, is recorded as an annual downpour. In the “ginger district,” 88 inches, or over 7 feet, has been the mean annual rainfall for the last twenty years. (In a report made by one of my correspondents in this district, October, 1897, 47 inches, or nearly 4 feet, of rainfall were recorded in sixteen days.) While ginger grows at suitable elevations all over the island, it is mainly produced in the central western portion, along the borders of the parishes of Westmoreland, St. Elizabeth, Manchester, Clarendon, Trelawney and St. James. The underlying soil of this district consists of white and yellow limestone, with trappean formation; this is covered in some of the nooks or valleys with a pulverent mould or loam deposit several feet in depth. The plant grows luxuriantly in such soil, but apparently will not thrive in marshy soil, nor where there is present more than 10 to 20 per cent. of clay or 30 per cent. of sand. The government returns for the whole island give only about 250 acres of land devoted to ginger. This amount of acreage would not yield the crop harvested. But the real cultivation is not in acres, many cultivators having beds varying from 6 feet square up to the size of a building lot. A few cultivate from one to six acres. Large plots are very rare. For the most part, it is put in the ground in any convenient spot, alongside pineapples, yams, cocoa, cassava or other plants, often in the midst of a dense growth of bush or weeds.



Sir Henry Arthur Blake, K. C. M. G., Governor of Jamaica.

In the statistics of this fertile island this article does not figure in pounds, shillings and pence as largely as do some of its other products. Economically speaking, however, ginger is one of its most important articles of commerce. In my judgment, from 25,000 to 50,000 of its people are more or less dependent upon the ginger crop for such ready money as is essential to maintain their existence. The cultivation and gathering of this drug is largely in the hands of that peculiar class of West Indian peasants known as Quashie. Quashie is the title given the snuff-colored and brown people as distinct from blacks, that make up nine-tenths of the inhabitants of the West Indies.

Though I know him well, it would be impossible to paint Quashie in words. To appreciate him, one must be in his actual presence. From a Northern standpoint he is poorly equipped for the battle of life; he is simple-hearted, unambitious, and intellectually poor. Life to him is not serious, nor very earnest. It is more like a sunny dream. He lives in a hut far back from the road, a home bowered in tangled foliage brilliant with flowers. It is one-storied, one-roomed, unfloored, thatched with palms, opening all around, plenty of ventilation, but it is orderly, clean and tidy. He has a

buxom mate, numerous daughters, but few sons. Like him, they are all symmetrically cast, clean, and full of tropical vitality. Food is more than abundant; it drops from the trees and springs up from the ground. Ever so few shillings pay the taxes, and supply clothing and all other wants, whether of necessity or luxury. He owes no man, and no man owns him. Thus, in humble surroundings, the typical ginger planter lives in more independence, ease and contentment than any dispenser of Jamaica ginger may even hope to attain.

The ginger planter is not given to taking in knowledge or giving out information. Long and vigorous cross-questioning will, in the end, only elicit the fact that he "doesn't rightly know" anything about ginger, or how much will be his own or his neighbor's crop. To the price or crop prospects, improvements in cultivation, difference in quality, he gives little thought or care. He divides ginger into "blue" and "yellow" from the color of the rhizome. These are also known as, respectively, "turmeric" and "flint." I was unable to see any botanical difference in the plant producing the two different colored root-stalks, and many intelligent planters were unable to distinguish the kinds without first examining the root. If anything, it seemed to me that the blue was a degenerate species. The root of the blue is hard and fibrous, yields a much less proportion of powder, is less pungent, and therefore less valuable commercially.¹

There is also a division into "plant" and "ratoon" ginger. Plant ginger is ginger that is planted each season; ratoon ginger is really a product of laziness. It is a return crop, secured by leaving a part of the "hand" containing a bud in the ground when the crop is harvested. Ratoon ginger is much smaller in size of hands than the planted, and loses each year in flavor, each successive crop being less and less in amount.

GINGER PLANTING.

Ginger is planted in March and April. The planting process consists in burying the divided fingers, each division containing an "eye" or embryo, in trenches or holes a few inches below the surface and about a foot apart, similar to the process of planting potatoes. The small grower simply digs a hole in a convenient spot. The thrifty planter first burns over his plot, to destroy weeds and insects, then ploughs and lays the plot out into beds and trenches.

The growing plant needs plenty of sun, and the weeds and bushes must be kept down. This latter is a perplexing problem, unless the weeds have been destroyed before the ginger has been planted. If the weeds are pulled or the ground disturbed while the plant is growing, water is apt to settle around the roots, and this rots them. The average Jamaica planter is not given to work, and he generally lets the weeds and ginger solve the question by fighting it out for themselves.

The reed-like ginger plant, with its leafy stems, grows sometimes to a height of 5 feet; its cone-topped flowering stems reach from 6 to 12 inches, and, in a well-cleaned field, make a pretty show when in their September bloom.

On wet soil and during very rainy seasons the root is subject to what is termed "black rotten." This is a rotting induced by warm, soggy soil. The root swells in spots, fills

¹ I found some shippers in Jamaica ports who were exporting the undried "blue" ginger to supply the demand for green ginger as used in pickling and preserving.

with water, turns black, and emits an offensive odor. In this condition it is attacked by insects and worms, which has given rise to the belief among the planters that the rotting is caused by a so-called ginger worm. (It is possibly a fungus disease.)



HOMES OF THE GINGER GROWERS.

Growing ginger must be well watered. Irrigation is practised to a limited extent, but in most of the parishes this is unnecessary, as the rainfall is abundant. Fertilization, though highly important, is rarely attempted, partly owing to the small profit, but largely owing to the customs of the country. The most that is ever done is to plough in the weeds and cover the ground with banana trash. Rarely will the planter ever gather up the manure from his livestock and throw it on the ginger-bed. There are no stables used in Jamaica, therefore no such thing as a compost heap. Sea weeds and watering the beds with sea water have been tried experimentally with good results; but no matter how large-sized roots or how fine a quality would be yielded, the average planter would not take the trouble to work his ground in a scientific manner.

An all-important feature is the rapid impoverishment of the soil that follows the ginger culture. One planter told me that only ferns would grow on the soil after exhaustion by this crop. There is thus a constant demand for virgin soil to secure the best-paying crops. This is attained by sending valuable timber up in smoke, as one authority tersely expressed it. "Dried-up streams, general barrenness, in fact a wilderness marks the progress of ginger culture."

The situation is clearly summed up by Mr. Wm. Fawcett, Director of Public Gardens for Jamaica, from whose report to the Honorable Colonial Secretary I quote:

“The soil which produces the very highest quality ginger, realizing, perhaps, £10 per cwt. in the London markets, is the very deep black soil of virgin forest. To grow ginger under this condition involves the destruction of large areas of forest. Magnificent trees, 6 feet in diameter, may be seen in some districts lying rotting on the ground, while the ginger cultivators have gone further to the centre of the island, abandoning the woodlands already cut down. The plan adopted in clearing a forest is for a cultivator to invite ten or twelve of his friends to a ‘cutting match.’ He provides food and drink, and the laborious work of felling trees is carried on merrily and without much expense. Afterwards, fire is put and the place is burnt over. This burning is considered very important, as much so as the virgin soil.

“Probably its importance is due principally to the deposit of potash and other mineral matters contained in the ashes, but the fire will also sweeten the ground, correcting sourness; and, moreover, it destroys insect pests. Some cultivators will only grow ginger in freshly-cleared woodland, and next year they move on to a new clearing; but although in this way they get very fine ginger, it is at the expense of forest land which would require a heavy outlay and perhaps a term of 100 years to restore. Albert Town was not long ago a great centre for the cultivation, but I was told there that growers had already got as far as 14 miles further inland.

“Ginger can be, and is, grown in many places year after year on the same ground. An intelligent cultivator at Borbridge stated that he knew of ginger growing for forty years in the same patch. Sanford Town is a German colony, and one of the original colonists, Somers, an active old man of eighty years of age, has been cultivating ginger and arrowroot there since his youth. He and the other colonists have been in the habit of planting a small patch one year, leaving it to ratoon as long as it was profitable, then throwing it up or growing other plants until, after a term of years, they again plant the same patch with, ginger. This is an irregular rotation of crops; ‘plant ginger,’ the product of planting, is of better quality than the ratoons, and the ratoons in each succeeding year are inferior. When the ground is too poor to grow ‘white ginger,’ the ‘blue ginger,’ the inferior variety, can be grown.

“More depends upon the curing of ginger, considering the crop as a livelihood, than soil. I believe that the badly-cured ginger brought sometimes to the market is due to wet weather, rather than to want of care.

“The export of ginger is, on the whole, on the increase, but if this is accompanied by the gradual destruction of woods and forests, it is not a subject of congratulation.”

An examination of the exhausted soil revealed the fact that it was deficient in organic matter, lime, phosphoric acid and soda. Attempts made, at my suggestion, to supply these deficiencies by the use of market fertilizers of various kinds were not productive of any favorable results. Stable manure alone resulted in a failure, as likewise did the use of a bat guano found on the island. The use of a marl, especially when mixed with stable manure, was a partial success.

The Jamaica Agricultural Society, in 1895, began a series of practical experiments which are still in progress. Their first results, gathered in February, 1897, were somewhat affected by a drought in the previous November. Upon a limited area of worn-out land, which in a check experiment gave no return, they secured a crop which would be equivalent to over 2,500 pounds of cured per acre, and the product was of extraordinary size and quality. The fertilizer aiding in bringing this result was a mixture of marl with a compound fertilizer made up of about 10 per cent. each of soluble phosphates, ammonia and potash salts. These results were very encouraging and the society have extended them by securing larger plots, giving aid to planters in the way of furnishing fertilizer, etc., returns from which will be gathered in the spring of 1898.

The solution of the problem of reclaiming land exhausted by the ginger and other crops, and the prevention of the further wasteful destruction of valuable soil, is in Ginger Land one of great moment. There is in this fair Island thousands upon thousands of acres of abandoned land, lying within easy reach of roads and ports; much of it has been abandoned because the soil has been exhausted by ginger or coffee. If by suitable tillage and manures it can be reclaimed, great benefits to the inhabitants will follow.

Ginger, as we know it, is the root-stalk of the plant. The root proper or root fibres are about $\frac{1}{2}$ inch long, not very numerous, dying off as the rhizome advances and leaving a slight scar. As regularly shaped hands, with more or less straight fingers, command the higher price in markets, experiments were made to secure a regular-shaped growth. Owing to the peculiarities of the native planter, instructions were not closely followed and the results were unsuccessful. The fact was developed that a sprout starts from the parent eye, and from this stem, in turn, lateral shoots or branches develop in pairs. These side branches again develop in pairs, these pairs generally alternating to opposite sides. It was found that if the soil was well worked and pulverized before planting, the growth was straighter than when planted in hard soil. Some difference was noted also in the condition of the parent plant; if this was well developed and vigorous, the resultant root-stalk was of a better type than where the parent was small, knarly and crooked. The Botanical Department is now experimenting with selected plants.

Ratoon ginger is gathered from March to December, but planted ginger is not ready for digging until December or January, and from then until March is the "ginger season."

Ginger is known to be ready for harvest when the stalk withers. This begins shortly after the bloom departs. The rhizomes are twisted out of the ground with a fork. In this operation, every bruise or injury to the hands is detrimental to the market value. There is quite a knack in doing this, and it takes long practice to become expert.

The hands are thrown in heaps, the fibrous roots are broken off, and the soil and adherent matter removed. This must be done quickly after removal from the earth, for, should the ginger be dried with the soil and roots still adhering, the product would not be white, and, if it lies in heaps before drying, it will mould. The custom is to throw

it immediately into a dish of water; it is then ready for the uncoating or peeling operation; this is done by hand. A planter who has any quantity of it on hand, will make a "peeling match" by gathering his own numerous family, and whatever help his neighbors can afford. The ginger season thus becomes a time of merrymaking.

It was my privilege and a part of my studies to be present at one of these peculiar harvest-home gatherings in Ginger Land. I was given a point of vantage overlooking the dancing hall, which on this occasion was the cement floor of the barbecue. The light of a few sickly lanterns, a smoky torch and the hot glare of the tropical moon gleamed on the dusky men and maiden ginger-peelers. Their dresses were marvels in color, the men in somber black, except for white vests and rainbow sashes. Against the dark-skinned forms of the gentler sex were brilliant reds, yellows, green and blues. Their skirts stood out balloon-like, stiff with cassava starch. Trinkets of silver and gold were heavy and plentiful. They danced to the music of squeaky accordions, clapping of hands, and the plaintive, wailing, but musical voices of the on-lookers. There was plenty of noise-plenty of ginger in that dance. The native "*Spiritus saccharum jamaicaiensis*" was dispensed freely, but I have seen much less orderly merry-makings in our own land of culture, and in all that excited, hot-blooded crowd not one was drunk or committed any flagrant breach of propriety. Past midnight I lay down on the only bed that the hut of my host Quashie afforded; at intervals I awoke, to find that the ginger dance was still on. When the first rays of light came over blue mountain peak, there, on the bed, under the bed, sprawled in heaps, over the floor, were the exhausted dancers, fast asleep. But for all they had made such a night of it, before the sun's rays had entered the cabin they had bathed their bodies in the cool spring, taken a cup of coffee, and were fresh for the day's work.

PEELING GINGER.

Ginger-peeling is an art, and there are many expert peelers in Jamaica. The ginger knife is simply a narrow-edged blade riveted to a handle. In large operations an expert peels between the fingers of the hands, less experienced hands peeling the other portions. Examination of a transverse section of ginger will show the importance of the operation. There is an outer striated skin under which there are numerous layers of very thin-walled cork cells. This layer contains numerous oil cells, the oil cells being most numerous at the bud points. The oil contained in these cells, in specimens fresh from the ground, is almost colorless, very pungent, and exceedingly aromatic. It becomes yellow very quickly on exposure to the air, and, even upon drying without removing the epidermis, its delicate aroma is found to be fleeting. On drying the ginger the contents of these cells appear as a yellow, pitchy mass. (It has been stated that this coloring matter is identical with that of Curcuma.) As this cork layer is the seat of the greatest amount of oil and resin cells, it will readily be seen that the deeper the peeling so much the more of these substances will be carried away with the epidermis, and more cells opened from which these principles may exude.²

As fast as peeled, the roots are thrown into water and washed. The purer the water and the more freely it is used, the whiter will be the product. Generally a very little water washes a great deal of ginger. The hands are peeled during the day, and allowed

²The Jamaica agricultural society has advertised in the United States and England the desirability of a machine or apparatus to be used in removing the coating from ginger; experiments along the line are now being made.

to remain in the water over night. This water acquires a slimy feeling and, if concentrated, becomes mucilaginous and acquires a warm and aromatic taste. The natives claim that this process soaks out the "fire and poison" from very hot ginger. I placed some pieces in a stream of running water for twelve hours, and succeeded in making them several shades lighter in color, This sample proved to be less pungent to the taste, and it is quite possible the force of the water carried away some portion of the aromatic principles.

A few planters use lime juice in the wash water. This gives a whiter root, having some solvent action on the coloring matter, but, as the lime juice contains saccharine and pectose matter, it prevents drying, and mildew follows. In another experiment I supplied the natives with citric acid, vinegar and acetic acid. They all worked fairly well, citric acid being the best whitening agent, but it was reported that the process was expensive and troublesome.

It is generally stated that ginger is deprived of its coat by being plunged into boiling water before being scraped. This practice is not used to any extent in Jamaica. Its effect is to swell the starch and bassorin-like gums. I found that after keeping the freshlypeeled root-stalks in boiling water for an hour they were considerably swollen and the steam was filled with the aroma of the ginger. Under this treatment the coating comes off easily; but, if the action of the boiling water is prolonged, the starch and fibre are acted upon, the product dries hard and the color is darkened. In fact, what is known as "black ginger" of the market is the result of this process. Ginger is found in the market coated with calcerous matter, such as carbonate of lime, etc., this is said to be to fill a demand for "white ginger." Such a proceeding is apparently unknown among the planters. Well-cured ginger has a decided white coating and that is all they know about it.

It has been stated that it is a common practice to bleach ginger with the fumes of chlorine or sulphurous acid. It may be done in the other parts of the world, but no instance of it is known in Jamaica.³ There is scarcely a planter with intelligence enough to use, or who would take the pains to employ, such a process. I tried chlorine gas as a bleaching agent, but at best the product was of a dirty yellow color. By using the fumes of burning sulphur, the whole being partially enclosed in glass, the heat of the sun aiding in the experiment, the ginger was whitened and mildew prevented. I found on trial that it might be of service to place the ginger in a weak solution of chloride of lime before drying; this would aid in bleaching and prevent mould.

CURING GINGER.

After washing, the process of drying follows: The tropical sun is the drying agent in all cases. Large operators have what is called a "Barbecue." This is a piece of ground several feet square, leveled off and laid with stone and the whole coated with cement. It is placed so as to receive the greatest amount of sunshine. The small planter uses what is called a "Mat," consisting of sticks driven into the ground, sawbuck fashion, and across these sticks are laid boards, palm, banana or other large leaves; oftener than otherwise, the place for drying is a few palm leaves spread upon the ground.

³ Bleaching by chemicals and coating with powders are market processes unknown to the planters.



Barbecue used in Drying Ginger.

Careful handlers put their ginger out as the sun rises, and turn it over at mid-day, taking it in at sundown. Rainy or cloudy weather invites mildew. It requires 6 to 8 days for the root to become thoroughly dry. I made several tests to ascertain the loss in weight by drying in the sun, and found the average to be nearly 70 per cent.



“Mat” for Drying Ginger.

Ginger dried in the sun for the market examined for moisture gave the following results:

Six samples, well-dried specimens, showed a further loss when dried at 100°C. as follows: 7.2, 8.5, 8.9, 9.5, 10, 11, 12 per cent.

Several poorly-dried specimens, some of which were damp and mouldy, gave from 15 to 26 per cent. moisture when dried at 100°C. During the progress of my attention to this subject, several attempts were made to utilize artificial heat in drying ginger. Such a course would, in some respects, be a very desirable one.

In a portion of the island given almost entirely to the cultivation of this product, a few years ago a wet season prevailed. It was impossible to dry the crop in the sun; as a consequence there was a loss of the crop, followed by considerable distress among the planters.

During my observations an attempt was first made to dry without removal of the skin coat. This, if successful, would have meant the saving of considerable labor. The product was quite dark, the flavor not as good as that of the sun-dried. By removing a part of the coat the drying was hastened. Dr. A. G. McCatty, a practicing physician

and owner of a plantation, at my suggestion, placed in operation an American fruit evaporator. It was necessary to use wood as a source of heat, and, partly owing to the high temperature and partly from the ignorance of the operator, the product so far has been rather poor in quality, the color many shades darker, much of the aroma was lost, and a smoky, burned flavor acquired. Other planters are trying the process on this year's crop.

A curious incident resulted during these experiments. The natives, through prejudice against innovations, boycotted the drying apparatus, and refused to furnish supplies at any price. Experiments were made with calcium chloride as a drying agent. The result did not equal samples produced by the native method of drying in the sun. Attempts made to dry the ginger after first slicing, as might be expected, resulted in great loss of flavor and pungency. My conclusions were that, when well conducted, the native method of careful peeling and curing in the sun would produce a handsomer and a better product than any process yet suggested.

These observations were not undertaken with a view of making any complete analysis, and it was found that a macroscopic examination by expert judges was far more reliable than any assay that could be made with limited facilities present in the ginger fields. A few such examinations were made as follows:

Ethereal Extract.—Exhaustion of the ginger with ether in a Soxhlet extraction apparatus. The resultant extract, after evaporation of the ether, was dried over sulphuric acid to remove moisture. From this extract the volatile oil was calculated by the loss on drying the ethereal extract at 110° C. for three hours. The only results from this process that seemed to be of value were that the finer grades, when carefully dried, contained a higher percentage of volatile oil.

Ginger dried without removing the peel gave somewhat higher results as to volatile oils than the peeled. The loss of this constituent was greater in a product dried by artificial heat than when dried by sun. The amount of volatile oil found by aforesaid process was, lowest, 1 per cent.; highest, 3.20 per cent. The results as to ethereal extract, exclusive of volatile oil or from alcoholic extract from the ether-exhausted residue, seemed to be of little value, the different specimens giving such greatly changing amounts as to afford no guide.

In these experiments some observations were made that were interesting, though of no particular value. In the extracts from ratoon ginger there was evidently a more fiery taste and less flavor than in the planted ginger. This was also true in regard to the extracts from the blue and yellow varieties, the yellow having a much finer odor and taste. Upon the addition of water to these extracts in sufficient amounts to precipitate the dissolved resins, it was observed that in the case of the well-cured specimens of plant ginger a delightful aroma was imparted to the water, a true ginger flavor, without fire or pungency. But in extracts from old ratoon ginger, from mildewed specimens spoiled in drying, this aroma was greatly changed, becoming musty and weak, the taste in some instances being decidedly bitter. Ninety-five per cent. alcohol was found to give better results as to flavor of extract than that of lower strength.

MOVING TO GINGER MARKET.



READY TO GO TO MARKET.

When the native tropical sun has fully dried the ginger crop, it is stored in heaps for market day. By unchangeable Ginger Land customs, there are certain days and times to carry products to market. There are banana days, pineapple days, pimento days and ginger days. The buyer must take in his supplies on these days or go without them.

The ginger crop is carried from five to forty miles to a place of sale. In the proper season, along the white-paved roads, from the cool, refreshing hours of the morning far into the night, ginger may be seen moving to market. The richer planter, with a lace bark rope, leads a heavily-laden donkey with panniers heaped. Sometimes piled high on either side, above the ginger are pineapples, plantains, yams, and strange-looking fruits; over all are bunches of knotted sugar cane and nets filled with green cocoanuts. But by far the greater portion of the ginger, and every other crop, is moved by head-loads.

Troops of Jamaica's brown and yellow daughters are seen trudging up and down hills under the terrible sun, with a load of a hundred pounds or more at graceful equipoise on their gaily-turbaned heads. All have their garments kilted up to their bare dark knees. These women have taken their colors from the fruits: their complexions are orange, olive, sapota, mango, deepening into a bronzeblack. They are upright as darts,

walk with a free, unhindered stride, without any swinging of the shoulders, impressing one greatly with their grace and elegance of motion. Carrying their heads like queens, without nod or turning, they cry out in a highpitched musical key, to the bystanders, "Marningbuckra," and pass on, their naked feet making a great whispering sound over the smooth roadway. In a picturesque way ginger passes to the market town.

The market may be in the port town or at the crossroads store. The sign at this latter place reads, in rather shaky characters, "Lisened to dele in Agricultural Produce," which is made to include rum, gin, and a general conglomeration of merchandise, not counting drugs and medicines. In this sort of a place anything in the shape of hands and fingers is ginger, and is dumped into a barrel without any sorting, to be shipped to the port. Often the small shopkeeper is heavily in debt to the large trader in the port, and, when ginger is wanted, makes haste to get in as much as possible, regardless of quality.

IN THE GINGER MARKET.

The markets of these West India towns are the important centres of commerce. Here, in a large open space near the quay, a great hurry and clatter of brisk business proceeds under the beautiful blue sky and blazing sunshine.

Quashie requires much conversation to complete a bargain. One would suspect by the bustle and noise that the entire wealth of the Island was changing hands every few minutes, but the truth is, the most prolonged and loud wrangle closes a transaction involving a minute fraction of a penny. There are a few benches or stalls under the market arcade, but they require a rental fee; so, for many, an upturned barrel outside constitutes a stall. Those who have no barrel pile their wares on the ground between their sprawling black limbs. It is a good place to study fruits and vegetables monstrous in size, with outlandish names, but luscious in looks. Many kinds of drugs are here in their primitive state, ginger in abundance. Nearly every other seller cries out: "Buckrayouwangingafoobuy" (white master, do you want to buy ginger?)

These black people speak with a rolling current of vowels and consonants, pouring them out so rapidly that none but an acclimated ear can detach an intelligible word. The ginger is not weighed, measured or counted, the standard is a "heap." A heap of ginger is a pile that enlarges or diminishes according to the law of supply and demand. If the hands are finely shaped and large, there are fewer in the heap; if they are small, dark and snarly, the heap is made larger. If the price of ginger goes up in London or New York, it is because the heaps in this market have been made smaller. If the price goes down, these heaps have become larger and finer. The price of ginger in the drug exchanges of the world is the reflection of the changing size of these petty heaps in Ginger Land.

The ruling price in Kingston and Montego Bay for the heap is a penny-ha'penny (about three cents). Heaps purchased by me varied according to quality, but the average weight was from one-fourth to one-half pound.

The buyers of ginger for shipping are expert and accurate. They grade, sort and price with a quick eye and ready touch gained by years of practice. The highest grades are

large-sized hands of light and uniform color, free from evidence of mildew. This grade is brittle and cracks easily, but broken pieces depreciate the value.

Buyers also require the hands and fingers to be firm and full, without wrinkles or spots. They generally assort into four or five grades, that which is shriveled and small being the lowest. The dark varieties form another, the heavy, tough and flinty a third. These four are finally assorted by placing hands which are small but of good texture and color as one grade. The larger-sized, well-bleached hands into the highest grade.

The ratoon finger sorts generally bring the lowest price, as they are small, soft and soggy, and lack flavor. Ginger gathered green shrivels much in drying, and is less aromatic and pungent than when fully matured. Ginger that has mildewed is spotted, and the mildew starts a decomposition that affects the flavor. Ginger put in bags or laid away before being thoroughly dried will mould and acquire a musty odor and flavor, which it is impossible to remove.

The largest-sized hands are carefully selected by buyers and shipped to special markets, usually to England. I noticed hands weighing as much as eight ounces; many of them weighing from four ounces upward.

Ginger is packed in barrels for shipment.

ECONOMICS.

The amount of ginger exported from this Island during the last ten years is shown in the following table⁴ :

	Pounds.
1887	1,121,827
1888	1,141,877
1889	1,002,653
1890 1/2 year)	554,193
1891	1,219,197
1892	1,822,531
1893	1,526,884
1894	1,672,384
1895	1,736,460
1896	1,960,609

The yield and profit of the ginger crop depend somewhat upon the nature of the soil. In favorable seasons rainfall, sunshine, planting, care and curing, are also factors. An average yield can be estimated at from 1,000 to 1,500 pounds dried ginger per acre. In

⁴ Figures obtained from the office of the collectors-general of Jamaica show that more than one-half of the crop is shipped direct to the United States ports. The amount of ginger imported into the United States from all parts of the world, from the years 1890 to 1894, was as follows:

	Pounds.
1890	2,328,825
1891	2,697,989
1892	1,431,295
1893	2,927,942

exceptional cases, 2,000 pounds have been gathered. There are planters in Jamaica who plant ginger here and there in patches, and gathering as little as a hundred pounds in a year. Ginger is well adapted to the small planter, and admirably suited to the peasantry of Jamaica, who, by slow evolution, are passing from serfdom to manhood and independence.

The exact cost of producing this crop is difficult to calculate. The present output is largely the product of domestic labor, whose value is hard to compute; when this class of labor is hired, it becomes very costly. The figures in the following table are approximate only; as now conducted there is chargeable against the crop the item of rent, or tax, (if the cultivator is an owner) the labor is mainly that of the family.

An approximate estimate of the expenditures and receipts on an acre of land planted in ginger are as follows:

Ground-rent or tax	\$5.00
Clearing land, ploughing and planting	40.00
Cost of plants	50.00
Digging and preparing	15.00
Peeling	45.00
Drying	25.00
Delivery at market	10.00

	\$190.00
Fertilizer (if used)	50.00
Superintendence	20.00

	\$260.00

Yield: 1,500 to 2,500 pounds (cured ginger), at 12 cents per pound, \$180 to \$300.

Viewed from this standpoint, the cultivation of ginger on a large scale would be far from remunerative. In this connection we may note that a Royal commission, appointed to investigate the depressed condition of the industries in the West India Islands, have recently submitted a report to Her Majesty's Government. Among the recommendations made was "The settlement of the laboring population on small plots of land as peasant proprietors." This corroborates our view that, from the Jamaica standpoint, it is better economy to leave the cultivation of ginger remain where it is. The introduction of artificial heat for drying, machinery for peeling, will have a tendency to deprive the peasantry of a source of income, and this, so far as these investigations show, will not improve the quality of the product.

The Botanical Department, through its corps of agricultural instructors, is now going among the people and showing them exactly what may be done in the way of improving their methods of cultivation. The Jamaica Agricultural Society is conducting practical and extensive demonstrations to show the use and value of fertilizers. These have already an important bearing upon this crop. Information recently to hand states that the crop which will be gathered in the coming season (Spring, 1898) will probably be the largest ever grown upon the Island. This is due to

the improvements in cultivation, together with an abundant rainfall. Unfortunately for the ginger planter, a largely-increased production will tend to lower prices.

I am aware of the fact that these notes will add but little to the already recorded observations upon ginger. It may be questioned whether such a common article of *materia medica* merits any extended research. We should, however, realize that any drug that holds a name and place in medicine is of sufficient importance to merit our best efforts.

Our knowledge of the changes which take place in crude drugs, due to the methods of preparation, is very meagre. Karl Dieterich (*Berichte der Deutschen Pharm. Gesellschaft*, 1896, p. 335) says:

“Thus it is that I am convinced that the study and development of this branch of pharmacy will yield far more than theoretical results and that the analysis of fresh and dried drugs at different ill be of great practical advantage in directing the proper stages will manipulations to be employed in producing uniform and superior products.” My convictions are strong that the study of drugs should begin in their habitat and extend to the bedside of the patient. That it is important to know every change that may take place in their cultivation and collection as well as those incident to their preparation for administration, this seems to be sufficient warrant for these observations taken in the Land of Ginger—Jamaica.⁵

⁵ In preparing this paper, valuable assistance has been rendered the writer by those whose names are mentioned therein. In addition, he feels indebted to His Excellency, Henry A. Blake, Governor of Jamaica; to the Hon. Q. O. Eckford, ex-United States Consul ; to George A. Douet, Esq., Secretary of the Jamaica Agricultural Society; to L. Frazer, of Montego Bay, and many others.